Biomass Policy Opportunities

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GREAT PLAINS INSTITUTE
Better Energy. Better World.

Great Plains Institute Today

Mission: To transform the way we produce, distribute and consume energy to be both economically and environmentally sustainable.

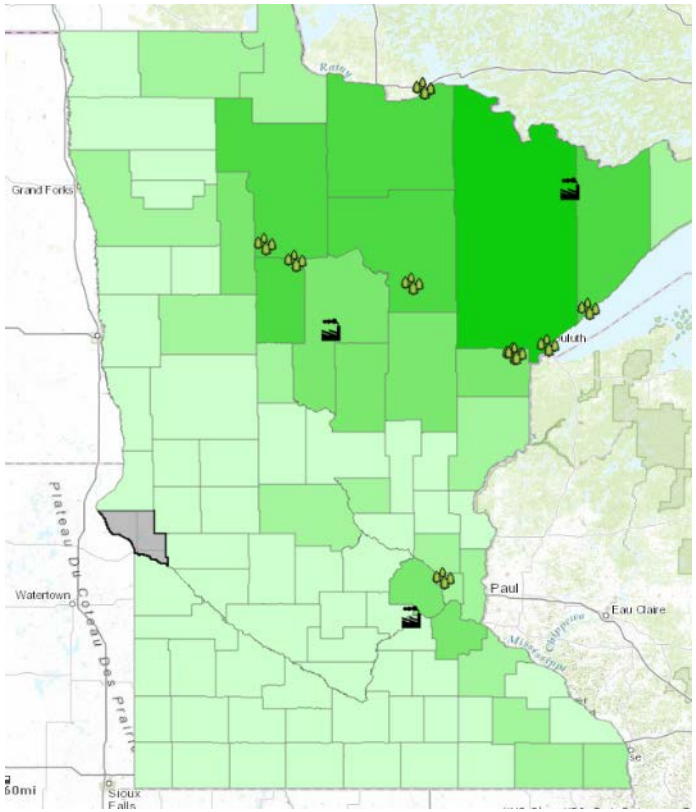
18-yr. old non-partisan, non-profit that:

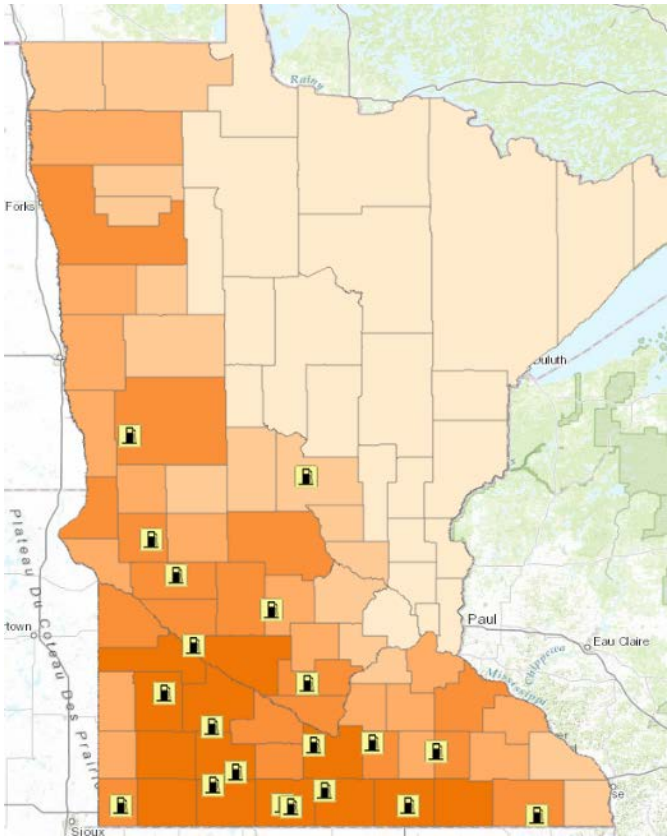
1. Develops better energy policy via consensus.
2. Catalyzes deployment of best energy technologies, practices & programs.
3. Provides reliable analysis & decision tools.

Important Biomass Opportunities for Minnesota

- Advanced Biofuels
- Renewable Chemicals
- Biomass thermal
- Combined heat and power
  - Biogas
  - Solid biomass
  - Non-renewable fuel

Large forestry biomass resource and large (but declining) forest products industry





Large agricultural biomass resource, and successful track record in creating an ethanol industry through effective state policy

Mission of the Bioeconomy Coalition of Minnesota

Articulate and implement a Minnesota state policy and regulatory agenda to expand renewable chemical, advanced biofuel, and biomass thermal energy industries, along the entire value chain from R&D through commercial production and use.

2015 Bioeconomy Coalition

What is an Advanced Biofuel?

Sugar
Beets, Corn

Cellulosic Biomass
Switchgrass, Wood,
Corn Stover & Ag
Residue

Waste
Municipal Waste,
Livestock Waste

Processing

e.g. enzymatic hydrolysis,
dilute acid hydrolysis,
metal catalysis,
etc…

Cellulosic Ethanol

Biodiesel

Butanol

Biogasoline

Biogas

Required GHG reduction: 50% lower GHG emissions than gasoline

What is a Renewable Chemical?

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Beets, Corn

Cellulosic Biomass
Switchgrass, Wood, Corn Stover & Ag Residue

Waste
Municipal Waste, Livestock Waste

Processing

e.g. enzymatic hydrolysis, dilute acid hydrolysis, metal catalysis, etc…

Plastics

PVC

3D Printing

Specialty Chemicals

Household Chemicals

Fabrics

Paint

Bioeconomy Production Incentive

- Program aims to attract commercial-scale production of renewable chemicals, advanced biofuels and biomass thermal energy
- Eligible facilities:
  - Must source raw materials (sugar, biomass) from Minnesota
  - Raw material must be from agricultural or forestry sources, or from solid waste.
  - Facility must be located in Minnesota
  - Facility must begin operation after July 1, 2015 (including existing facilities with significant retrofits to allow new production after July 1, 2015)
  - Project must start before July 1, 2025

Production Incentive Levels

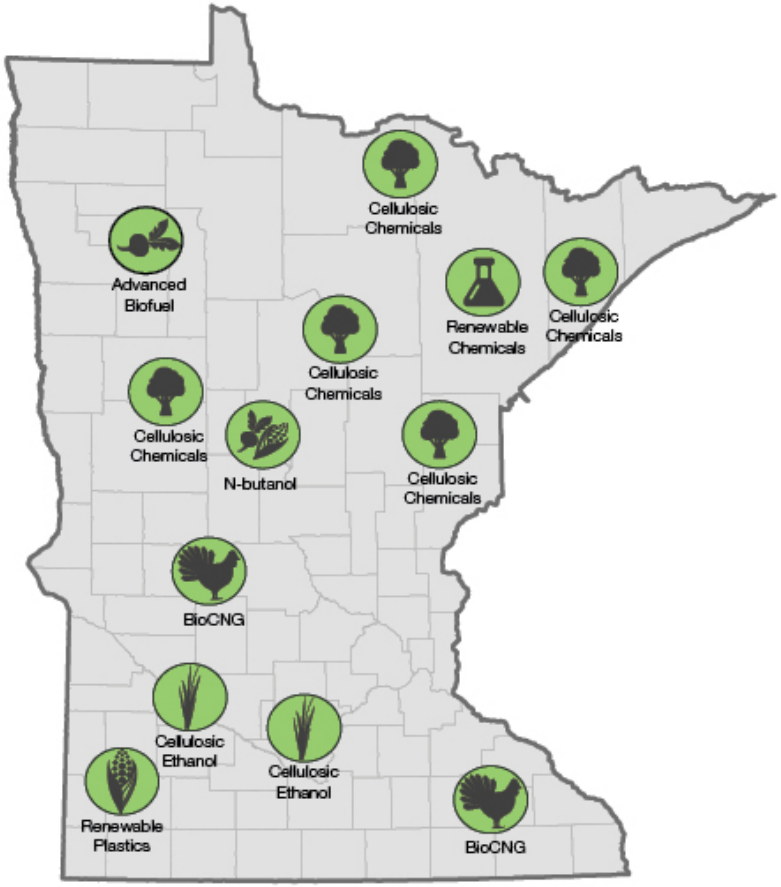
- Advanced biofuels
  - $0.20/gal – cellulosic derived
  - $0.10/gal – sugar/starch derived
  - Total payments capped per year, available for 10 years
  - Up to 6 projects (or more if projects are smaller)
- Renewable Chemicals
  - $0.03/lb – sugar derived renewable chemical or cellulosic sugar
  - $0.06/lb – cellulosic derived renewable chemical
  - Total payments capped per year, available for 10 years
  - Up to 6 projects (or more if projects are smaller)
- Biomass Thermal
  - $5.00/MMbtu – agricultural or forestry feedstocks
  - Total payments capped per year, available for 10 years
  - Up to 5 projects (or more if projects are smaller)

Program Funding

- $500,000 FY 2016 and $1.6 million FY 2017
  - FY 2015 must be spent by June 30, 2017
  - FY 2016 must be spent by June 30, 2018
- Base funding of $1.5 million in FY 2018 and FY 2019

Minnesota Development Opportunities

Bioeconomy State Economic Contribution



Example project types and locations are hypothetical and for purposes of modeling economic impact of possible projects

A Growing Industry

14 hypothetical facilities:

- 1 x Renewable Chemicals from Sugar
- 1 x Renewable Plastics from Corn Sugar
- 2 x Cellulosic Ethanol from Ag. Residue
- 5 x Cellulosic Chemicals from Wood
- 1 x N-butanol from Corn and/or Beet Sugar
- 2 x BioCNG from Ag. and Livestock Waste
- 1 x Advanced Biofuel from Beet Sugar

$ 23.8 million temporary annual government investment*
$ 837.6 million permanent annual economic impact
$ 1.5 billion temporary construction economic impact

Economic Impact

	Type	Employment	Labor Income (millions)	Output (millions)
Annual	Direct	590	$ 36.8	$ 470.3
	Indirect	2,150	$ 115.8	$ 304.0
	Induced	450	$ 21.5	$ 63.3
	Total	**3,190**	**$ 174.1**	**$ 837.6**
Construction	Direct	4,380	$ 303.4	$ 867.8
	Indirect	1,690	$ 112.7	$ 306.2
	Induced	2,620	$ 122.1	$ 357.4
	Total	**8,690**	**$ 538.2**	**$ 1,531.4**

Impact estimates based on University of Minnesota Extension Economic Impact Analysis

*Over 15-20 years

BIOECONOMY
COALITION OF MINNESOTA

COMBINED HEAT AND POWER

What is Combined Heat and Power (CHP)?

- Integrated energy system
- Simultaneously generates useful electric and thermal energy from single fuel source
- Not a single technology BUT a suite of currently available technology applications

CHP Applications

- Manufacturers
  - Biofuels, chemicals, oil refining, pulp and paper, food processing
- Institutions
  - Colleges and universities, hospitals, prisons
- Municipal
  - Wastewater treatment facilities, K-12 schools
- Residential
  - Multi-family units, condos, planned communities

Policy and Regulatory Issues

- Incentives and tax treatment
- Standby Rates
- Inclusion in clean energy and/or energy efficiency standards or goals
- Output-based Emissions Regulations
- Emissions accounting

MN Efforts

- MN Dept. of Commerce – Division of Energy Resources
  - CHP stakeholder process
  - CHP action plan
- MN Public Utilities Commission
  - Generic docket on standby rates

ADDITIONAL OPTIONS

Loan guarantee program

- Eligible technologies: anaerobic digestion, institutional-scale biomass thermal energy
- Structure as a “gap loan” program – help finance projects that have other financing, but are $1-2 million away.
- $30-40 million dollar fund, may result in 15-20 projects.

Residential biomass thermal energy incentives

- Offer a rebate or tax credit program for purchasing home biomass heating stoves and boilers.
- Restrict program to technologies with very low air emissions
- Emphasize parts of the state reliant on delivered fuels.

Thank You!

More information:
www.betterenergy.org
www.mnbioeconomy.org

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